

Job Outlook

Job openings should be plentiful. General maintenance mechanics is a large occupation with significant turnover, and many job openings should result from the need to replace workers who transfer to other occupations or stop working for other reasons.

Employment of general maintenance mechanics is expected to grow more slowly than the average for all occupations through 2008. Employment is related to the number of buildings—for example, office and apartment buildings, stores, schools, hospitals, hotels, and factories—and the amount of equipment needing maintenance and repair. As machinery becomes more advanced, however, the need for general mechanics diminishes.

Earnings

Median hourly earnings of general maintenance mechanics were \$11.20 in 1998. The middle 50 percent earned between \$8.43 and \$14.99. The lowest 10 percent earned less than \$6.56 and the highest 10 percent earned more than \$18.83. Median hourly earnings in the industries employing the largest numbers of general maintenance mechanics in 1997 are shown below:

Local government, except education and hospitals	\$11.90
Hospitals	11.30
Real estate agents and managers	9.80
Real estate operators and lessors	9.40
Hotels and motels	8.20

Some general maintenance mechanics are members of unions, including the American Federation of State, County, and Municipal Employees; and the United Automobile Workers.

Related Occupations

Some duties of general maintenance mechanics are similar to those of carpenters, plumbers, industrial machinery repairers, electricians, and heating, air-conditioning, and refrigeration mechanics.

Sources of Additional Information

Information about job opportunities may be obtained from local employers and local offices of the State Employment Service.

Millwrights

(O*NET 85123A and 85123B)

Significant Points

- Training generally lasts 4 to 5 years—through apprenticeship programs that combine on-the-job training with classroom instruction—or through community college coupled with informal on-the-job training.
- Although employment is projected to decline slightly, skilled applicants should have good job opportunities.
- About 58 percent belong to labor unions, one of the highest rates of membership in the economy.

Nature of the Work

Millwrights install, repair, replace, and dismantle the machinery and heavy equipment used in many industries. Responsibilities require a wide range of skills—from blueprint reading and pouring concrete to diagnosing and solving mechanical problems.

The millwright's responsibilities begin when machinery arrives at the job site. New equipment must be unloaded, inspected, and moved into position. To lift and move light machinery, millwrights use rigging and hoisting devices, such as pulleys and cables. In other cases, they require the assistance of hydraulic lift-truck or crane operators to position the machinery. Because millwrights often decide which device to use for

moving machinery, they must know the load-bearing properties of ropes, cables, hoists, and cranes.

Millwrights consult with production managers and others to determine the optimal placement of machines in a plant. In some instances, this placement requires building a new foundation. Millwrights either prepare the foundation themselves or supervise its construction, so they must know how to read blueprints and work with building materials, such as concrete, wood, and steel.

When assembling machinery, millwrights fit bearings, align gears and wheels, attach motors, and connect belts, according to the manufacturer's blueprints and drawings. Precision leveling and alignment are important in the assembly process; millwrights must have good mathematical skills, so they can measure angles, material thickness, and small distances with tools such as squares, calipers, and micrometers. When a high level of precision is required, devices such as lasers and ultrasonic measuring tools may be used. Millwrights also work with hand and power tools, such as cutting torches, welding machines, and soldering guns. Some of these workers use metalworking equipment, such as lathes or grinders to modify parts to specifications.

In addition to installing and dismantling machinery, many millwrights repair and maintain equipment. This includes preventive maintenance, such as lubrication and fixing or replacing worn parts. (For further information on machinery maintenance, see the statement on industrial machinery repairers elsewhere in the *Handbook*.)

Increasingly sophisticated automation means more complicated machines for millwrights to install and maintain. For example, millwrights



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may install and maintain numerical control equipment—computer controlled machine tools that fabricate manufacturing parts. This machinery requires special care and knowledge, so millwrights often work closely with computer or electronics experts, electricians, engineers, and manufacturer's representatives to install it. (Statements on electronics repairers, commercial and industrial equipment, as well as electricians, appear elsewhere in the *Handbook*.)

Working Conditions

Working conditions vary by industry. Millwrights employed in manufacturing often work in a typical shop setting and use protective equipment to avoid common hazards. For example, protective devices, such as safety belts, protective glasses, and hard hats may prevent injuries from falling objects or machinery. Those in construction may work outdoors in uncomfortable weather conditions.

Millwrights may work independently or as part of a team. They must work quickly and precisely, because disabled machinery costs a company time and money. Many millwrights work overtime; nearly half report working more than 40 hours during a typical week. During power outages, millwrights have been assigned overtime and shift work, because of shift requirements.

Employment

Millwrights held about 82,000 jobs in 1998. Most worked in manufacturing, primarily in durable goods industries, such as motor vehicles and equipment and basic steel products. Other millwrights were employed primarily by construction firms and machining and equipment wholesalers; many of these workers are contractors. Although millwrights work in every State, employment is concentrated in heavily industrialized areas.

Training, Other Qualifications, and Advancement

Millwrights are responsible for the mechanical maintenance, repair, overhaul, and installation of machinery, so training is varied and extensive. Millwrights normally train for 4 years—through apprenticeship programs that combine on-the-job training with classroom instruction—or through community college coupled with informal on-the-job training. These programs include training in dismantling, moving, erecting, and repairing machinery. Trainees may also work with concrete and receive instruction in related skills, such as carpentry, welding, and sheet-metal work. Classroom instruction is provided in mathematics, blueprint reading, hydraulics, electricity, computers, and electronics.

Employers prefer applicants with a high school diploma or equivalency and some vocational training or experience. Courses in science, mathematics, mechanical drawing, computers, and machine shop practice are useful. Millwrights are expected to keep their skills up-to-date and may need additional training on technological advances, such as laser shaft alignment and vibration analysis.

Because millwrights assemble and disassemble complicated machinery, mechanical aptitude is very important. Strength and agility also are necessary, because the work can require a considerable amount of lifting and climbing. Millwrights need good interpersonal and communication abilities to work as part of a team and to be able to give detailed instructions to others.

Advancement for millwrights usually takes the form of higher wages. Some advance to supervisor or superintendent, whereas others may become self-employed contractors.

Job Outlook

Employment of millwrights is projected to decline slightly through the year 2008. Nevertheless, skilled applicants should have good job opportunities, because millwrights will be needed to maintain and repair existing machinery, dismantle old machinery, and install new equipment. Job openings will stem from the need to replace experienced millwrights who transfer to other occupations or leave the labor force.

Automation, technological advances, and the growing utilization of lower-paid workers will contribute to the decline in employment.

As automation of machinery becomes more widespread, there is a greater need for repair work than for the installation of new machinery. Millwrights are becoming more productive through the use of technologies like hydraulic torque wrenches, ultrasonic measuring tools, and laser shaft alignment, as these technologies allow fewer workers to perform more work. In addition, the demand for millwrights will be adversely affected, as lower-paid workers, such as electronics technicians and industrial machinery mechanics, increasingly assume some installation and maintenance duties. Nevertheless, historical employment of millwrights has been fairly stable, and the growing use of machinery in the Nation's economy should ensure that the employment decline will be small.

Earnings

Median hourly earnings of millwrights were \$17.76 in 1998. The middle 50 percent earned between \$14.11 and \$21.80. The lowest 10 percent earned less than \$11.35 and the highest 10 percent earned more than \$24.38. Median hourly earnings in the industries employing the largest numbers of millwrights in 1997 are shown below:

Motor vehicles and equipment	\$21.60
Paper mills	18.60
Miscellaneous special trade contractors	17.00

Earnings vary by industry and geographic location. About 58 percent of millwrights belong to labor unions, one of the highest rates of membership in the economy.

Related Occupations

To set up machinery for use in a plant, millwrights must know how to use hoisting devices and how to assemble, disassemble, and sometimes repair machinery. Other workers with similar job duties include industrial machinery repairers; aircraft mechanics and service technicians; ironworkers; machine assemblers; and mobile heavy equipment, diesel, and farm equipment mechanics.

Sources of Additional Information

For further information on apprenticeship programs, write to the Apprenticeship Council of your State's labor department, local offices of your State employment service, or local firms that employ millwrights. In addition, you may contact:

- ✦ The United Brotherhood of Carpenters and Joiners of America, 101 Constitution Ave. NW., Washington DC 20001.
- ✦ Associated General Contractors of America, 1957 E St. NW., Washington, DC 20006. Internet: <http://www.agc.org>
- ✦ The National Tooling and Machining Association, 9300 Livingston Rd., Fort Washington, MD 20744. Internet: <http://www.ntma.org>
- ✦ The Precision Machined Products Association, 6700 West Snowville Rd., Brecksville, OH 44141. Internet: <http://www.pmpa.org>

Mobile Heavy Equipment Mechanics

(O*NET 85314)

Significant Points

- Opportunities should be good for persons with advanced knowledge of electronics and hydraulics.
- This occupation offers relatively high wages and the challenge of skilled repair work.
- National certification is the recognized standard of achievement for mobile heavy equipment mechanics.

Nature of the Work

Mobile heavy equipment is indispensable to construction, logging, surface mining, and other industrial activities. Various types of equipment grade land, lift beams, and dig earth to pave the way for development.